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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 183/02001WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DE2003/000981	International filing date (day/month/year) 25 March 2003 (25.03.2003)	Priority date (day/month/year) 27 March 2002 (27.03.2002)
International Patent Classification (IPC) or national classification and IPC C08G 18/32, C09D 175/04, C08G 18/80		
Applicant PPG INDUSTRIES LACKE GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of _____ sheets.
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 27 October 2003 (27.10.2003)	Date of completion of this report 21 May 2004 (21.05.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
 pages _____ 1-12 _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages _____ 1-18 _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
 These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-18	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-18	NO
Industrial applicability (IA)	Claims	1-18	YES
	Claims		NO

2. Citations and explanations

Citations

D1: EP-A-0414099
D2: US-B1-6248225
D3: EP-A-0355682
D4: DE-A-19849208

Subject matter of the application

The application relates to a polyurethane with at least two free OH groups produced by

(i) a first reaction of an NCO compound with a primary and/or secondary alkanolamine, causing the amine group of the alkanolamine to react with the NCO groups, forming urea, followed by

(ii) the addition of a cyclic carboxylic acid anhydride to the OH groups of the intermediate product, opening the anhydride ring.

It is assumed, on the basis of the applicant's explanations, that the free OH groups mentioned in claim 1 are not the OH groups of a carboxylic acid. This in turn implies that these OH groups must result from the alkanolamine component, not from the carboxylic acid component mentioned in the claim. This in turn implies that the carboxylic acid anhydride is used in the claimed

process in such quantities that not all the OH groups from the alkanolamine react with the COOH groups of the carboxylic acid component.

Novelty (PCT Article 33(2))

D1 (column 5, line 12 - column 8, line 8) describes the reaction of a polyisocyanate with an amino compound, producing an urea-containing compound. The latter is reacted in a second stage with an acid anhydride, producing an acid-functionalised urea compound. An amine with anhydride-reactive XH groups, for example, can be used as amine, in which XH would stand for OH, for example. The groups reactive to anhydride can be added in equimolar or excess quantities.

Starting from this disclosure, the following selections must be made in order to arrive at the claimed subject matter:

- (i) selection of an amine with XH groups from the amines disclosed in D1,
- (ii) selection of an OH group for XH from the units represented by XH in D1,
- (iii) selection of an excess quantity of anhydride-reactive groups, so that OH groups remain in the end product.

An aminoalcohol component is used as the amine component in all examples mentioned in D1 (this corresponds to the aforementioned selections (i) and (ii)). However, in none of the examples the quantity of OH groups in the urea component obtained after the first reaction step is greater than the number of acid groups used. No free OH groups thus remain in the end products obtained in the examples.

Consequently, it can be concluded that D1 does not contain any hint of the multiple selection required to arrive at the claimed subject matter, and novelty over D1 can be acknowledged.

Example 5 of D2 discloses a polyurethane resin produced by the following reaction steps:

- (i) production of a polyisocyanate prepolymer with caprolactam-blocked isocyanate groups,
- (ii) reaction of the resulting prepolymer with diethanolamine and aminopropyldiethanolamine until no more free NCO groups are present, and
- (iii) reaction of the resulting product with dimethylolpropionic acid.

The present application differs from D1, *inter alia*, in that a cyclic carboxylic acid anhydride is used instead of the dimethylolpropionic acid used in D2 (reaction step (iii)).

D3 and D4 disclose the production of a polyurethane prepolymer which contains NCO groups and its subsequent reaction with alkanolamines (page 2, lines 25-37 of D3, and page 2, lines 55-62 of D4). An additional reaction with carboxylic acid anhydride is not disclosed.

Novelty over documents D2-D4 can therefore be acknowledged.

Document D5 was published after the priority date of the present application. No discussion of that document is therefore necessary during the international phase.

Inventive step (PCT Article 33(3))

Like the present application, D3 deals with the

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preparation of filler compositions with improved hardness and resistance to flying stones (page 2, lines 1-15). D3 can therefore be regarded as the closest prior art.

The present application differs from D3 in that an additional reaction with a carboxylic acid anhydride is carried out. There is no proof in the application that this additional reaction solves a problem in a surprising manner in relation to D3. In this respect, it is pointed out that nothing is mentioned in the comparative example contained in the application about the structure of the polyurethane used therein, and it is therefore not possible to determine whether the additional incorporation of the carboxylic acid anhydride leads to an improvement of the product in relation to said example. The comparative example thus cannot support the solution to the problem. If no proof is furnished that a problem is solved, however, an additional process step must be considered to be disadvantageous, since it represents an additional expenditure. A disadvantage cannot be acknowledged to involve an inventive step, which must therefore be denied.